

PhD program in Civil, Chemical and Environmental Engineering

Curriculum in Fluid Dynamics and Environmental Engineering

Academic year 2022/2023

(due to the interdisciplinary nature of the topic,
students from other curricula or PhD courses are welcome)

1. Title of the course

Satellite and aerial images: automatic processing and analysis

2. Contents

- *Images and sensor*: the colour and its compositions, digital images, formats and resolutions; ortophotos;
- *Introduction to Satellite Remote Sensing*: elements of radiometry and radiation propagation, spectral signature of natural surfaces, the atmospheric effect on remotely sensed data; main satellite missions for environmental remote sensing;
- *Image pre-processing*: histogram modification and filtering, band composite and spectral indices; possible applications to case studies in civil protection (floods, fires), thematic and metric map updating, environmental monitoring and pollution detection;
- *Image processing*: georeferencing, supervised and unsupervised automatic classification; object based and pixel based classifiers;
- *Geodata and GIS*: Hints on reference systems, cartographic projection and the EPSG code, main features of raster and vector data, Digital Models and GeoWebServices;
- *Exercise lessons on geodata visualization and image processing in QGIS*

A basic knowledge of geodata and their processing in GIS is required.

3. Structure of the course

The course consists of lectures (8h) and a computer exercise (4h) in GIS environment.

4. Lecturers

Bianca Federici

5. Duration and credits

12 hours, 2 credits

6. Period and registration procedure

The course will be held in January - February 2023, according to the need of the participants.
For registration and information send an email to bianca.federici.et.unige.it

7. Deadline for registration

Registration within the 10th of January 2023.

8. Final exam

The final examination will be an oral presentation of a theoretical deepening or an experience of automatic processing and analysis of aerial or satellite optical images. The date will be agreed with the students.